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in the faunas of the Pacific Coast waters and those eastward of them. The Sierras and Coast ranges are referred to a single mountain system.——A. D. Achiardi gives the particulars of an examination into the macroscopical and microscopical characters of the trachyte and quartziferous porphyry of Donoratice, near Pisa, Italy. The trachyte is covered, here and there only, with Eocene sediments which seem to have been disturbed by the eruption. The porphyry traverses the parti-colored schists of the Upper Lias and also the marbles of the Lower Lias, and is only about 400 meters distant from the trachyte, the space between being occupied by Eocene sediments. D'Achiardi finds the materials of these two rocks to be chemically the same, and the mineral species contained in them, for the most part, identical, but while the trachyte has cooled rapidly upon the surface of the rocks, the porphyry was intruded through them, and cooled slowly. The same mineralogist notes the presence in the Apuan Alps of tormalinolite.

Tertiary.—Mr. W. Whitaker, in a Note on the Red crag of Norfolk, Eng., states that the unfossiliferous sand upon the surface of the crag is identical with the sand of the shelly crag below, which has not been eroded by surface waters before the deposition of the upper beds, but dissolved by the action of carbonated water after the overlying beds were deposited.

Glacial.—Professor J. E. Todd (Proc. Amer. Assoc., 1884) describes the geology and geography of the Missouri coteau, which he states to be neither a high plateau nor a typical one. It is built mostly of Cretaceous clays of the St. Pierre group, capped northward with thin even layers of Fox Hills sandstone, and southward with Loup River sandstone. Two moraines are quite easily traceable upon it, and these, from their elevation, position and general features are probably equivalent to the Altamont and Gary moraines named by Professor T. C. Chamberlin on the Coteau des Prairies. The outer moraine is the more pronounced, consisting of loops, convex usually toward the west and south, but in rare cases toward the north-west. Traces of four great lobes of the ice-sheet, pushing through from the James to the Missouri, can be found.

MINERALOGY AND PETROGRAPHY.[1]

METEORITES.—A number of very important contributions to the literature of these interesting bodies, which reach our globe directly from the regions of space, have recently been published. Papers relating to meteorites have heretofore been largely confined to detailed descriptions of particular falls. With the exception of Rose's essay on the classification of these bodies, little of a general nature regarding them has been produced until within the past year or two. Now, however, we have at least four extensive works dealing with their classification and the results of their microscopical and chemical study. These are, moreover, quite different in their aim and scope.

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[1] Edited by Dr. GEO. H. WILLIAMS, of the Johns Hopkins Univ., Baltimore, Md.

First may be mentioned Dr. M. E. Wadsworth's Lithological Studies,[1] the first part of which, published in October, 1884, contains much useful information regarding meteorites. The results of the microscopical study of thin sections of these bodies by many investigators, as well as by Dr. Wadsworth himself, are here brought together in convenient form. They are very properly classified with terrestrial rocks as a part of the same series, in which they also represent certain members more basic than any found in the earth's crust near its surface.

Probably the work which will do most to spread abroad just and accurate ideas of the exact nature and mineralogical composition of the meteorites, is the series of microphotographs recently published by Professor G. Tschermak, of Vienna.[2] There is scarcely any one to whom a richer collection of this rare material was accessible, nor any one better fitted by his own researches for successfully preparing such a volume. Thin sections, one hundred in number, illustrating every phase of structure and composition met with among meteoric stones, have been reproduced so admirably by photography as to afford the best possible substitute for the originals. When it is remembered how few can ever hope to thoroughly study sections of meteorites themselves under the microscope, the value of these photographs, which necessarily far exceed any possible descriptions, will be appreciated. Each plate is accompanied by a full explanatory text. The work was executed by J. Grimm, of Offenburg, who is already well known for his superb microphotographs of rock sections, edited by Professor E. Cohen. The same firm promises a similar set to illustrate the structure of meteoric irons, the appearance of which will be awaited with interest.

Professor Staislas Meunier, of Paris, has recently published an elaborate work entitled " Les Météorites."[3] In this he presents a new classification, as well as his views respecting the origin of these bodies. The latter agree with those of Reichenbach, Haidinger and Tschermak in considering meteorites, at least such as possess a breccia-like appearance, as aggregations of much smaller bodies of matter distributed through space, which have been brought together by their mutual attraction.

Another extremely important paper on meteorites is that by Dr. Aristides Brezina, curator of the royal mineralogical cabinet of Vienna.[1] This is ostensibly a report on the condition of the meteoric collection belonging to the cabinet, but really contains much matter of very general interest. Brezina can find nothing in the structure of the meteorites to indicate a secondary or conglomerate nature. He regards them as the product of a very rapid crystallization from a homogeneous magma. Respecting their origin, he considers the old theory of Chladni (1818) and von Hoff (1835) as the most probable. According to this the meteorites reach the external atmosphere of the earth as dust-like or gaseous agglomerations, which, by the sudden diminution of their cosmic velocity, are enormously heated and at the same time condensed into solid bodies. The classification adopted is in the main a petrographical one, following in the principal groups those of Rose and Tschermak. Many new subdivisions are, however, introduced to cover the results of the more thorough and elaborate study. The meteoritic collection in Vienna is the largest in the world, representing 358 localities, while that of London has 350 and that of Paris 300.

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[1] Memoirs Mus. Comp. Zool. at Harvard Col. Vol. XI, pt. I, Oct., 1884.

[2] Die mikroskopische Beschaffenheit der Meteoriten, erläutert durch photographische Abbildungen. Stuttgart, 1885.

[3] Les Météorites. Paris, 1884. Appendix to Vol. II of Fremy's Encyclopédie Chimique.

Short notices have recently appeared by Professor C. U. Shepard, on the Fomatlán, Jalisco, Mexico meteorite (which fell August, 1879), which is composed largely of olivine and octahedral crystals of nickeliferous iron;[2] also by the same writer on the meteoric iron of Trinity county, California.[3] Meteoric irons have also been described and analyzed by N. T. Lupton from Santa Rosa, Mexico;[4] by George F. Kunz, from Glorietta Mt., Santa Fé county,[5] New Mexico; and by R. B. Riggs, from Grand Rapids, Michigan.[6]

Mineralogical News.—All mineralogists will be glad to welcome the new and enlarged edition of Professor P. Groth's invaluable treatise on physical crystallography.[7] This work, which has done such good service ever since its appearance in 1876, has been partially rewritten and considerably extended, especially by its descriptions of all the newest methods and apparatus for mineralogical investigation.——The admirable text book of mineralogy by Professor G. Tschermak, published in 1884, has become so popular that a second enlarged edition of it has already appeared.[8]——Professor J. Hirschwald, of Berlin, has issued a systematic description of the mineral collection of the Royal Technical High School, which will be of service to all mineralogists and collectors.[1]——F. Rinne concludes that crystals of milarite, which are apparently hexagonal, were really so at the time of their formation, and that their molecular disturbance is due to a subsequent change of conditions, as is true in the case of leucite and boracite.[2]

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[1] Die Meteoritensammlung des k. k. mineralogischen Hofkabinets in Wien am 1 Mai, 1885. Jahrbuch der k. k. Geol. Reichsanstalt, xxxv, p. 126, 1885.

[2] *Am. Jour. Science,* Aug., 1885.

[3] Ib., June, 1885.

[4] Ib., March, 1885.

[5] Ib., September, 1885.

[6] Ib., October, 1885.

[7] Physikalische Krystallographie. Zweite auflage. Leipzig, 1885.

[8] Lehrbuch der Mineralogie. 2te Auflage. Wien, 1885. pp. 598.

PETROGRAPHICAL NEWS.—The second part of the second volume of Professor J. Roth's Allgemeine Chemische Geologie has just appeared. This treats of the younger eruptive rocks, and especially on account of the wonderful completeness of its literature references, will form, as do the other parts of the same work, a most valuable addition to the library of every working geologist and mineralogist.——A very concise elementary text-book of microscopical petrography has recently appeared, by Professor A. von Lasaulx, of Bonn.[3] In spite of its small size it brings the essential points of this rapidly developing science down to date, and is especially to be recommended for its full bibliography.——In his recent exhaustive optical study of the mineral leucite, Professor C. Klein, of Göttingen, describes in some detail a new and very complete mineralogical and petrographical microscope, which is constructed by the well-known firm of Voigt & Hochgesang, of Göttingen.[4] This instrument, of which a cut is given in their latest catalogue (1885), may be had for 800 marks ($200), and is undoubtedly the most satisfactory microscope in the market for the especial uses for which it is intended.——Fr. Becke, of the University of Czernowitz, contributes a paper on the twinning of rock-forming pyroxene and amphibole.[5] He finds in certain Hungarian pyroxene andesites that the bronzite crystals are frequently grouped in radiating groups, in accordance with three twinning laws, viz: twinning planes 1, $P\overline{\infty}$ (vom Rath); 2, $\frac{2}{3}P\overline{\infty}$, and 3, $\frac{4}{3}P\infty$. The first of these is the most common and corresponds very closely to the twinning law for augite, twinning plane $P\grave{2}$. The frequently mentioned twins of augite and hornblende in rocks, with a composition—face apparently inclined to the vertical axis, the writer follows Mr. George F. Becker[6] in considering merely ordinary twins, parallel to $\infty P\overline{\infty}$, which are cut in the section parallel to some pyramidal face.——J. H. Kloss, of Karlsruhe, has made some interesting contributions to the subject of secondary hornblende in rocks.[7] He finds abundant evidence of compact as well as fibrous hornblende (uralite) originating from the paramorphosis of pyroxene, and can see no reason why a single, homogeneous individual of the former mineral should not replace one of the latter. He furthermore thinks that such secondary hornblende (which cannot be regarded as an alteration product in the common sense), should be used for purposes of rock classification, and suggests names as uralitite, uralite-diabase, uralite-gabbro, etc., to be employed, of course, only where the secondary nature of the hornblende was beyond doubt.——Professor C. R. Van Hise, of Madison, publishes an important paper on the secondary enlargement of hornblende fragments in clastic rocks[1] altogether analogous to those which he and Professor R. D. Irving have previously described as occurring in the case of quartz and feldspar.[2] In certain conglomerates of Northern Minnesota hornblende fragments have been enlarged by the deposition of their own substance from solution in such a manner that the crystallographic and optical orientation of the crystal is retained, and twinning lamellæ are even continued into the newly-formed portion.——Professor J. W. Judd, of London, continues his studies of the eruptive rocks of the West of Scotland, in an interesting paper on the Tertiary and older Peridotites.[3] Aside from the great interest attaching to these rocks from their being of Tertiary age, Professor Judd calls attention to their remarkable freshness as calculated to throw light upon the original form of the minerals of the more basic massive rocks. Many of these, like labradorite, olivine, hypersthene and diallage, are well known to often possess a peculiar luster on cleavage surfaces due to the presence of inclusions. These are generally regarded as original in their nature, but Professor Judd considers them as secondary. He thinks that at great depths, under the action of pressure, circulating waters would have such an increased solvent effect that in certain planes a portion of the crystalline substance would be dissolved, leaving cavities of regular shape, resembling in their nature the "etched figures" which are produced in crystalline planes by the action of certain reagents. Into these cavities, or negative crystals, foreign matter is infiltrated, thus producing the so-called inclusions of indeterminable microlites. This process is designated as "*schillerization*."——Messrs. Hague and Iddings contribute a most important paper on the development of crystallization in the igneous rocks of Washoe, Nevada,[4] to which no justice can be done here. Their main point is the convincing evidence they adduce to show that one and the same eruptive mass may solidify in a glassy form at the surface, and with a holocrystalline structure—even a coarsely crystalline structure—at great depths. The two forms are connected by every transitional stage.

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[1] Das mineralogische Museum der Könl. tech. Hochschule. Berlin, 1885.

[2] Neues Jahrbuch für Min., etc., 1885. II, p. I.

[3] Einführung in die Gestenislehre: Ein Leitfaden für den akademischen Unterricht und zum Selktstudium. pp. 215. Breslau, 1885.

[4] Neues Jahrbuch für Min., etc., Beil. Bd. III, p. 540.

[5] Tschermak's. Min. und Petrog. Mitth., VII, 93. 1885.

[6] Geology of the Comstock Lode. Monographs U. S. G. S., Vol. III, p. 113, pl. IV, fig. 28.

[7] Neues Jahrbuch für Min., etc., 1885. II, p. 82. Versammlung deutscher Naturforscher und Ærtze in Strassburg. Sept. 18–23, 1885.

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[1] *American Journal Sci.*, Sept., 1885.

[2] Bulletin of the U. S. Geol. Surv., No. 8.

[3] Quarterly Journal of the Geol. Soc., Aug., 1885.

[4] Bulletin U. S. Geological Survey, No. 17. Washington, 1885.